



The background of the slide is a high-angle, nighttime aerial photograph of a dense urban area. The city is filled with numerous skyscrapers of varying heights, their windows glowing with warm orange and yellow lights. The streets below are a network of bright white and yellow streaks from moving vehicles. In the foreground, there's a large, dark building with a prominent, light-colored, angular rooftop structure. The overall atmosphere is one of a bustling, modern metropolis.

nuveen

APPLIED ANALYTICS / SALES MODELS

Agenda

Background

Objectives

Methodology

Variables

Models & Findings

Recommendations

- # Background
- Nuveen is headquartered in Chicago, with offices around the world.
 - They are tasked with **marketing and selling mutual funds** through investment professionals.
 - They were acquired by TIAA for \$6.3 B. **TIAA has over \$1 trillion in assets** under management.
 - Nuveen **charges investors a percent** of assets under management.
 - Their goals are to **acquire** new clients, **sell** more to existing clients, & **reduce** redemptions by acquiring, developing, and retaining.

Objectives ==>

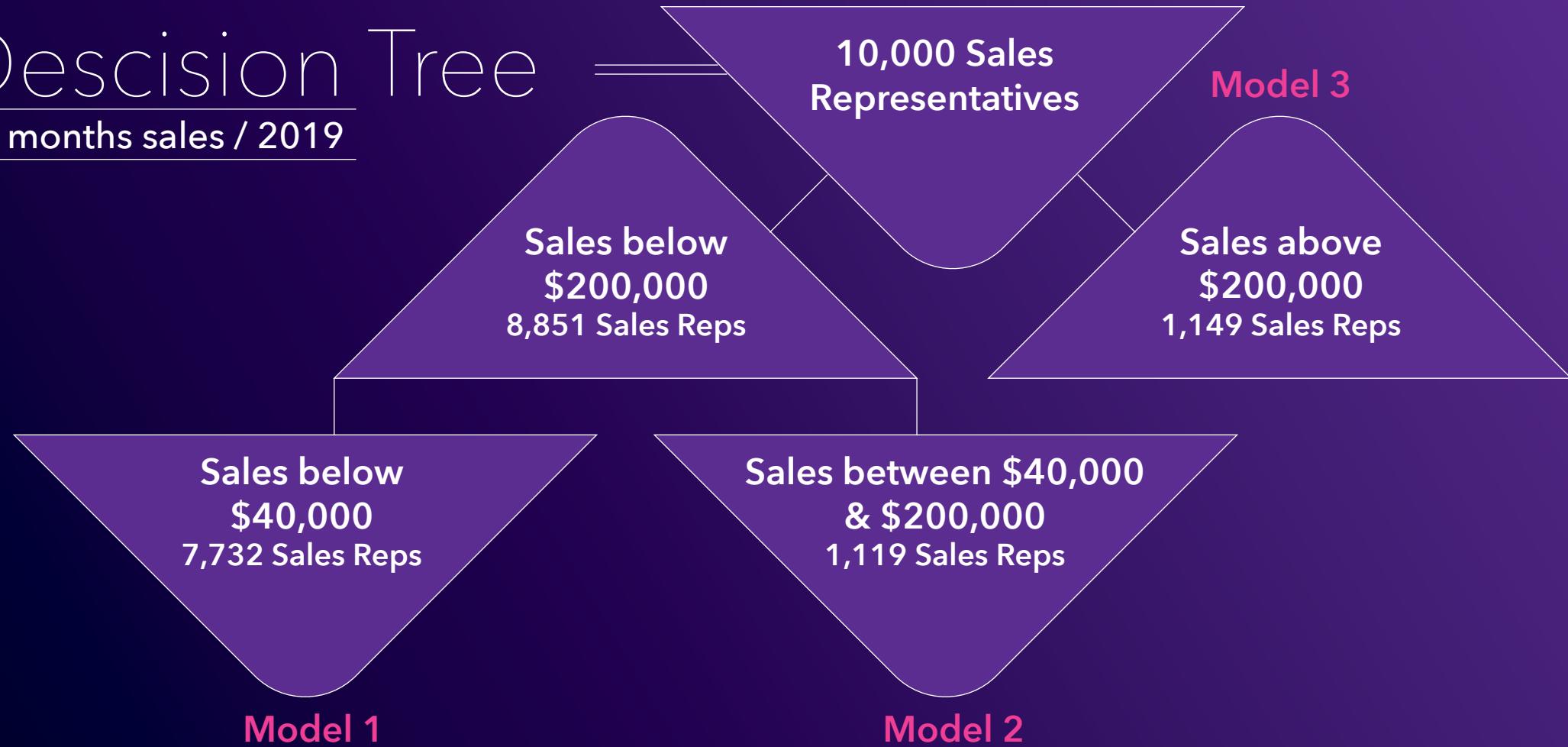
- Assist sales and marketing by improving their targeting, and allowing them to correctly assign coverage channels.
- Predict sales for 2020 using the data from 2018 and 2019.
- Develop multiple Regression Analyses Models & show the lift that will be achieved through those models.
- Segment advisors into three groups:
1- salesforce 2- phone 3- email

Methodology ==

- Analyze the Data
- Clean the Data
- Create Independant variables
- Divide the Data into categories
- Create Training, Validation & Testing Datasets
- Run multiple Regression Analysis & Cross Validation Algorithms
- Create Lift Charts & Recommendations

Decision Tree

12 months sales / 2019



Model 1 =

12 months sales up to Nov 2019

Sales below \$40,000

7,732 Sales Reps = 77% of the total advisors

Independant Variables ===== Model 1



Variables that are contributing to the model / Standardized Dataset / 2018 Data

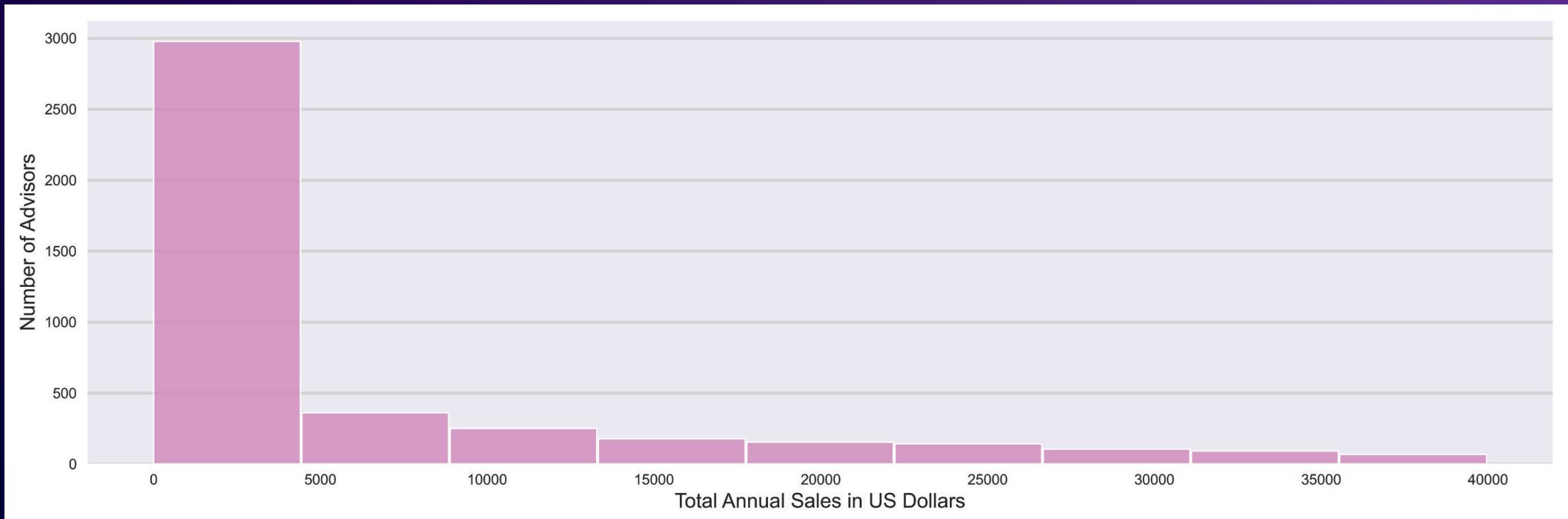
Most Positive Influencers

- no_of_Redemption_12M_1K
- no_of_Redemption_12M_10K
- no_of_funds_redeemed_12M_1
- no_of_funds_Redemption_12M_10K
- no_of_assetclass_sold_12M_1
- no_of_assetclass_Redemption_12M_10K
- total_annual_sales

Most Negative Influencers

- no_of_sales_12M_10K
- no_of_fund_sales_12M_10K
- no_of_assetclass_redeemed_12M_1
- no_of_assetclass_sales_12M_10K
- No_of_fund_curr
- No_of_asset_curr
- new_Fund_added_12M

Total Annual Sales /2018 = Model 1



Analysis:

Less than 5% of the 7,732 advisors had sales close to 40,000 US Dollars, while almost 3,000 advisors had sales between 0 & 5000 US Dollars.

Asset Classes sold /2018

Model 1



Analysis:

About 10% of the advisors sold 3 to 4 Asset Classes over the last 12 months of the year 2018.

Lift Chart

Model 1

n·_advisors	Sales_per_advisor	lift_percentage	n·_advisors_cumulative	Sales_per_advisor_cumulative	lift_percentage_cumulative
1	430	70,711.78 \$	73.77 %	430	70,711.78 \$
2	430	67,329.83 \$	65.46 %	860	33,664.92 \$
3	430	61,318.19 \$	50.69 %	1,290	20,439.4 \$
4	430	54,251.15 \$	33.32 %	1,720	13,562.79 \$
5	430	38,890.83 \$	-4.43 %	2,150	7,778.17 \$
6	429	36,355.26 \$	-10.66 %	2,579	6,059.21 \$
7	430	31,011.89 \$	-23.79 %	3,009	4,430.27 \$
8	430	24,614.25 \$	-39.51 %	3,439	3,076.78 \$
9	430	11,794.42 \$	-71.02 %	3,869	1,310.49 \$
10	430	10,632.3 \$	-73.87 %	4,299	1,063.23 \$

Analysis:

- Advisors in deciles 1,2,3 & 4 have positive lifts, with cumulative lift of 56%.

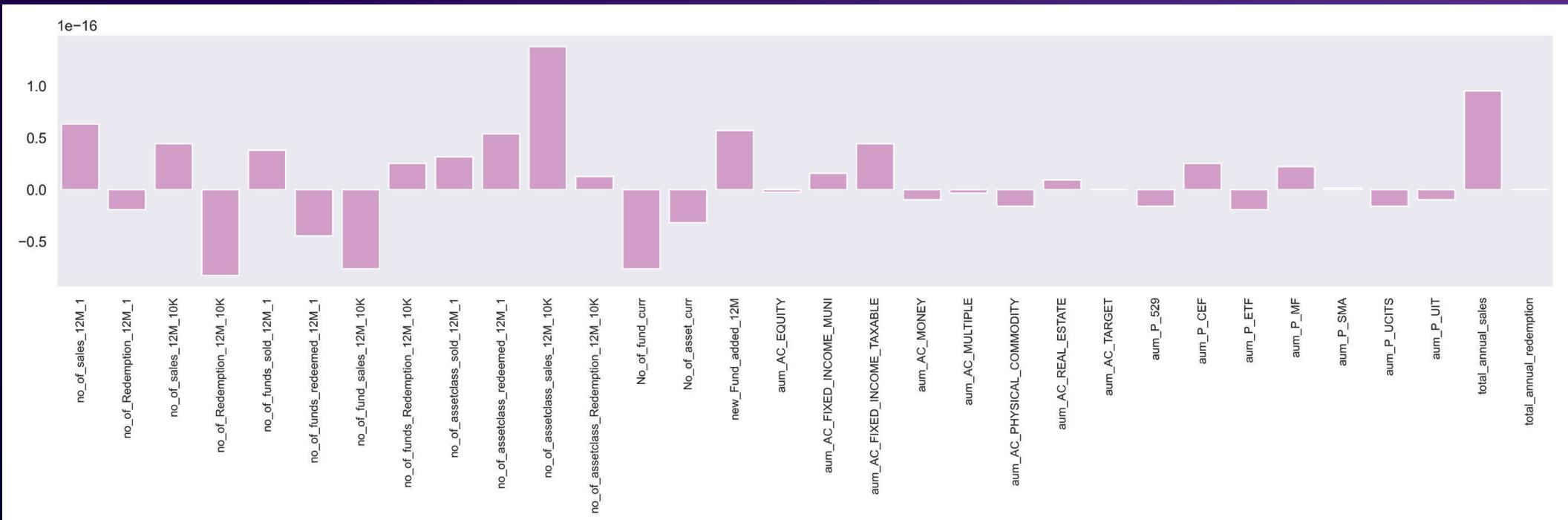
Model 2 =

12 months sales up to Nov 2019

Sales between \$40,000 & \$200,000

1,119 Sales Reps = 11% of the total advisors

Independant Variables ===== Model 2 =====



Variables that are contributing to the model / Standardized Dataset / 2018 Data

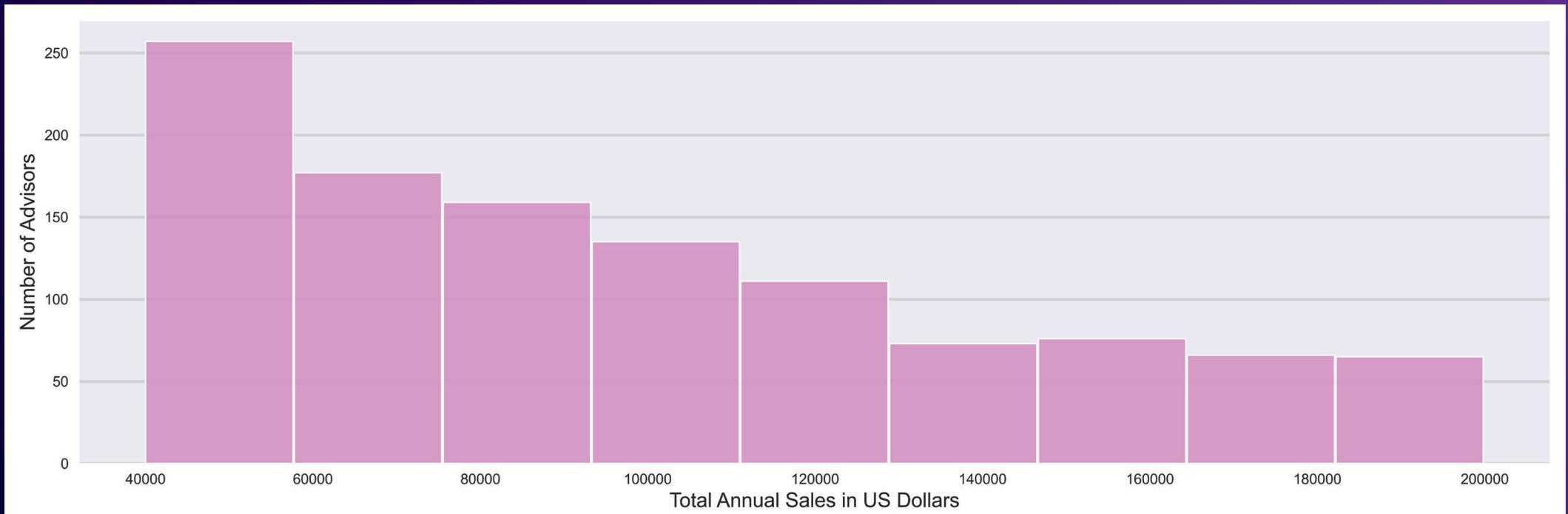
Most Positive Influencers

- no_of_sales_12M_1
- no_of_sales_12M_10K
- no_of_funds_sold_12M_1
- no_of_funds_redemption_12M_10K
- no_of_assetclass_sold_12M_1
- no_of_assetclass_redeemed_12M_1
- no_of_assetclass_sales_12M_10K

Most Negative Influencers

- new_Fund_added_12M
- aum_AC_FIXED_INCOME_TAXABLE
- aum_P_CEF
- aum_P_MF
- total_annual_sales
- no_of_Redemption_12M_1K
- no_of_funds_redeemed_12M_1
- no_of_fund_sales_12M_10K
- No_of_fund_curr
- No_of_asset_curr

Total Annual Sales /2018 = Model 2

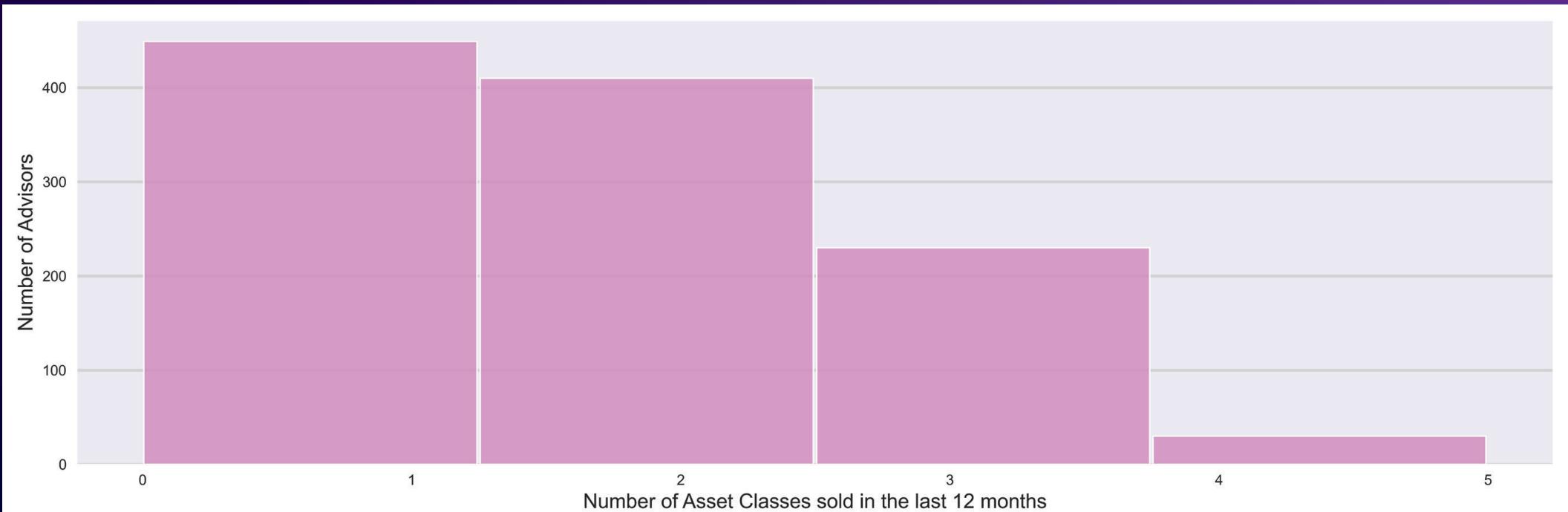


Analysis:

Less than 5% out of the 1,119 advisors had sales close to 200,000 US Dollars, while more than 260 advisors had sales between 40,000 & 60,000 US Dollars in sales.

Asset Classes sold /2018

Model 2



Analysis:

Less than 4% of the advisors sold 3 to 4 Asset Classes over the last 12 months of the year 2018.

Lift Chart

Model 2

	n·advisors	Sales_per_advisor	lift_percentage	n·advisors_cumulative	Sales_per_advisor_cumulative	lift_percentage_cumulative
1	118	259,334.28 \$	61.38 %	118	259,334.28 \$	61.38 %
2	117	191,042.3 \$	18.88 %	235	95,521.15 \$	40.13 %
3	118	187,434.39 \$	16.64 %	353	62,478.13 \$	32.3 %
4	117	182,755.41 \$	13.73 %	470	45,688.85 \$	27.66 %
5	118	172,742.42 \$	7.49 %	588	34,548.48 \$	23.62 %
6	118	161,248.51 \$	0.34 %	706	26,874.75 \$	19.74 %
7	118	130,776.77 \$	-18.62 %	824	18,682.4 \$	14.26 %
8	118	125,319.55 \$	-22.02 %	942	15,664.94 \$	9.73 %
9	118	123,336.34 \$	-23.25 %	1,060	13,704.04 \$	6.06 %
10	118	73,444.59 \$	-54.3 %	1,178	7,344.46 \$	0.03 %

Analysis:

- Advisors in deciles 1,2,3,4,5 & 6 have positive lifts, with cumulative lift of 20%.

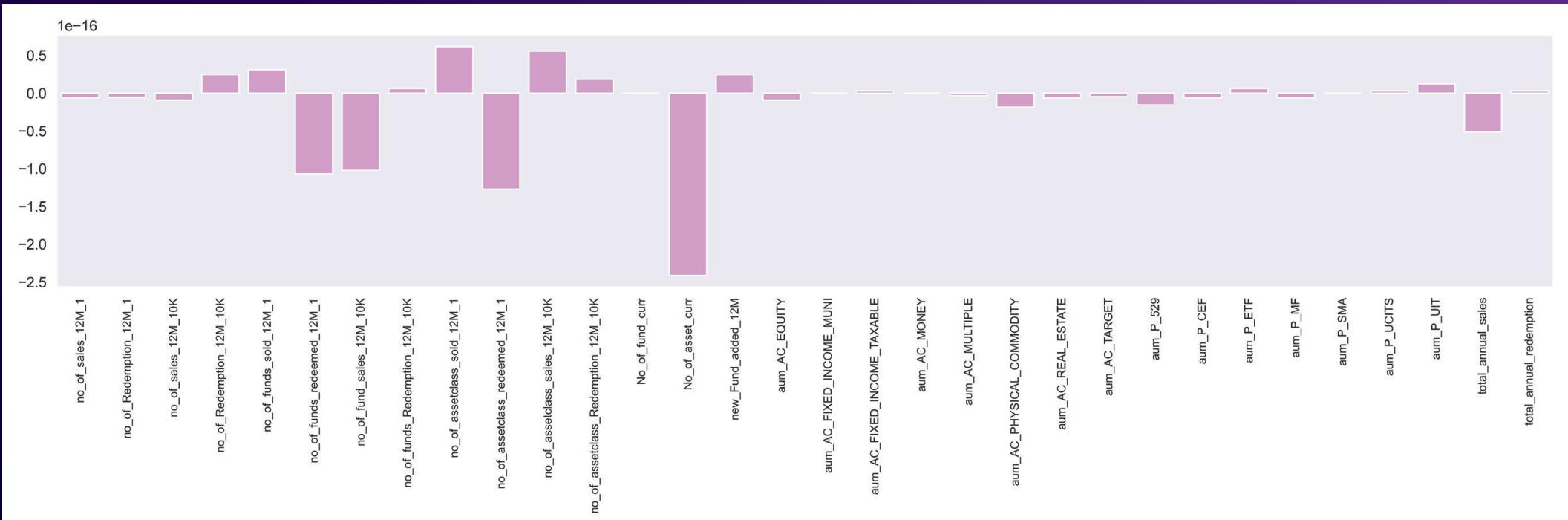
Model 3 =

12 months sales up to Nov 2019

Sales above \$200,000

1,149 Sales Reps = 12% of the total advisors

Independant Variables ===== Model 3 =====



Variables that are contributing to the model / Standardized Dataset / 2018 Data

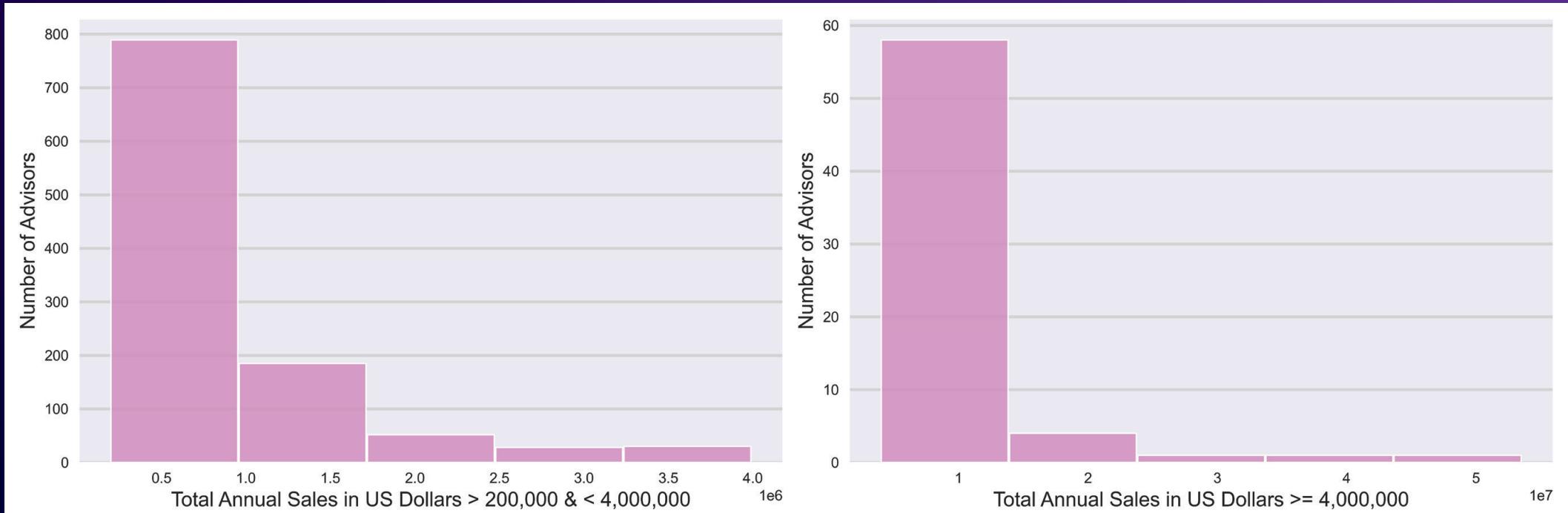
Most Positive Influencers

- no_of_Redemption_12M_10K
- no_of_funds_sold_12M_1
- no_of_assetclass_sold_12M_1
- no_of_assetclass_sales_12M_10K
- no_of_assetclass_Redemption_12M_10K
- no_of_fund_added_12M

Most Negative Influencers

- no_of_funds_redeemed_12M_1
- no_of_funds_sales_12M_10K
- no_of_assetclass_redeemed_12M_1
- no_of_asset_curr
- total_annual_sales

Total Annual Sales /2018 = Model 3



Analysis:

More than 93% of the 1,149 advisors had sales between 200,000 & 400,000 US Dollars, almost 5% of the advisors has sales between 400,000 & 1,000,000 US Dollars, while the remaining 2% had sales for more than 1,000,000 US Dollars.

Asset Classes sold /2018

Model 3



Analysis:

About 95% of the advisors sold 1 to 3 Asset Classes over the last 12 months of the year 2018.

Lift Chart

Model 3

	n_advisors	Sales_per_advisor	lift_percentage	n_advisors_cumulative	Sales_per_advisor_cumulative	lift_percentage_cumulative
1	134	3,972,946.1 \$	307.21 %	134	3,972,946.1 \$	307.21 %
2	133	1,593,211.9 \$	63.3 %	267	796,605.95 \$	185.26 %
3	134	1,118,968.15 \$	14.69 %	401	372,989.38 \$	128.4 %
4	133	692,752.56 \$	-28.99 %	534	173,188.14 \$	89.05 %
5	133	564,251.82 \$	-42.17 %	667	112,850.36 \$	62.81 %
6	134	469,013.23 \$	-51.93 %	801	78,168.87 \$	43.68 %
7	133	392,011.96 \$	-59.82 %	934	56,001.71 \$	28.9 %
8	133	375,199.61 \$	-61.54 %	1,067	46,899.95 \$	17.59 %
9	134	366,283.43 \$	-62.46 %	1,201	40,698.16 \$	8.7 %
10	134	202,338.53 \$	-79.26 %	1,335	20,233.85 \$	-0.1 %

Analysis:

- Advisors in deciles 1,2 & 3 have positive lifts, with cumulative lift of 128%.

Final recommendations =====

Low Priority => Tele sales team =====

Model 1	Model 2	Model 3
Decile 1 to 4 : < 71,000 \$ & > 54,000 \$	Decile 1 to 6 : < 260,000 \$ & > 161,000 \$	Decile 1 to 3 : < 4,000,000\$ & > 1,100,000 \$
Decile 5 to 10: < 39,000 \$ & > 10,000 \$	Decile 7 to 10: < 130,000 \$ & > 72,000 \$	Decile 4 to 10: < 695,000\$ & > 200,000 \$

Sales between 40,000 \$ & 100,000 \$

Recommendation

Model 1 => Decile 1 to 4

Mid Priority => Phone calls =====

Model 1	Model 2	Model 3
Decile 1 to 4 : < 71,000 \$ & > 54,000 \$	Decile 1 to 6 : < 260,000 \$ & > 161,000 \$	Decile 1 to 3 : < 4,000,000\$ & > 1,100,000 \$
Decile 5 to 10: < 39,000 \$ & > 10,000 \$	Decile 7 to 10: < 130,000 \$ & > 72,000 \$	Decile 4 to 10: < 695,000\$ & > 200,000 \$

Sales between 100,000 \$ & 500,000 \$

Recommendation

Model 2 => Decile 1 to 9

Model 3 => Decile 6 to 10

High Priority => In-person visit =====

Model 1	Model 2	Model 3
Decile 1 to 4 : < 71,000 \$ & > 54,000 \$	Decile 1 to 6 : < 260,000 \$ & > 161,000 \$	Decile 1 to 3 : < 4,000,000\$ & > 1,100,000 \$
Decile 5 to 10: < 39,000 \$ & > 10,000 \$	Decile 7 to 10: < 130,000 \$ & > 72,000 \$	Decile 4 to 10: < 695,000\$ & > 200,000 \$

Sales above 500,000 \$

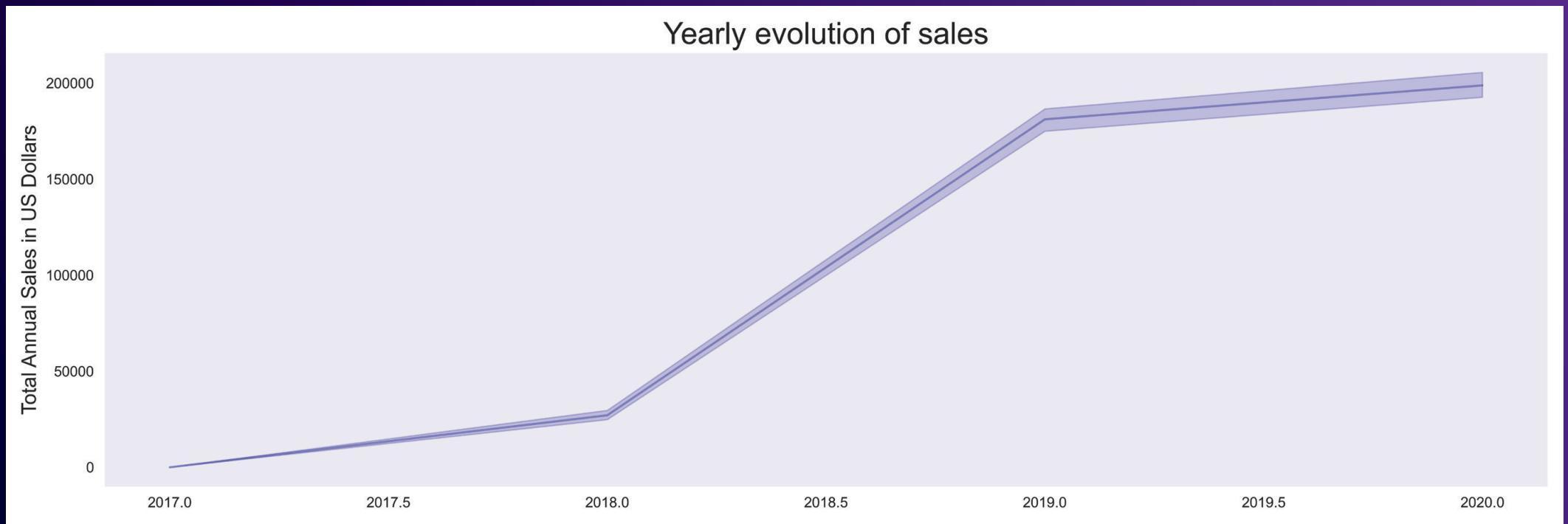
Recommendation

Model 3 => Decile 1 to 5

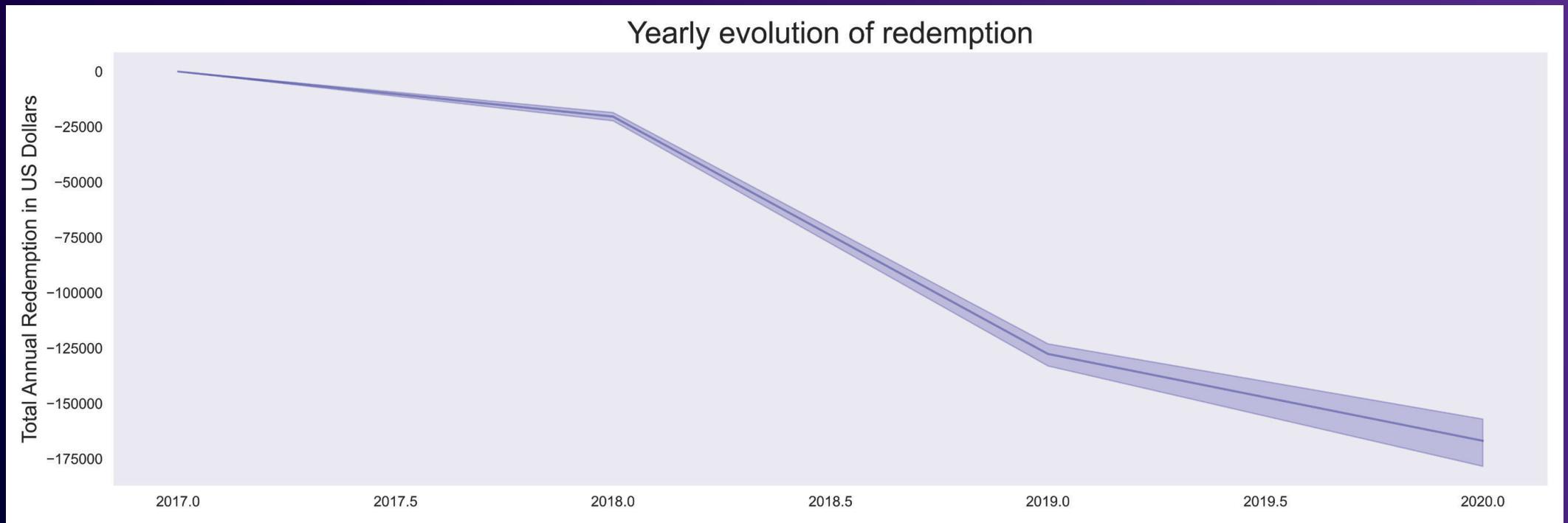
Thank you! =====

Appendix

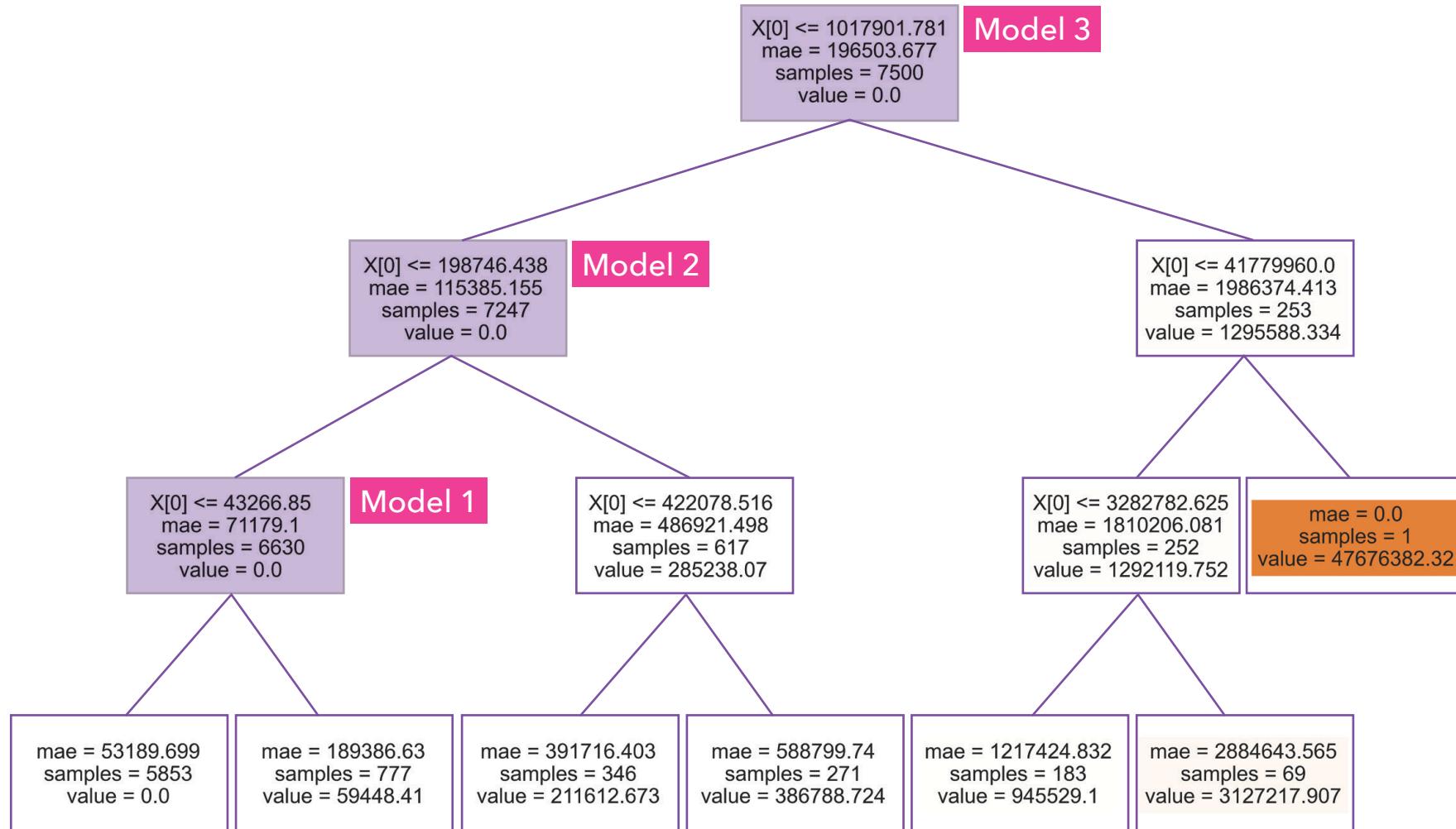
Evolution of sales through the years



Evolution of redemption through the years ==

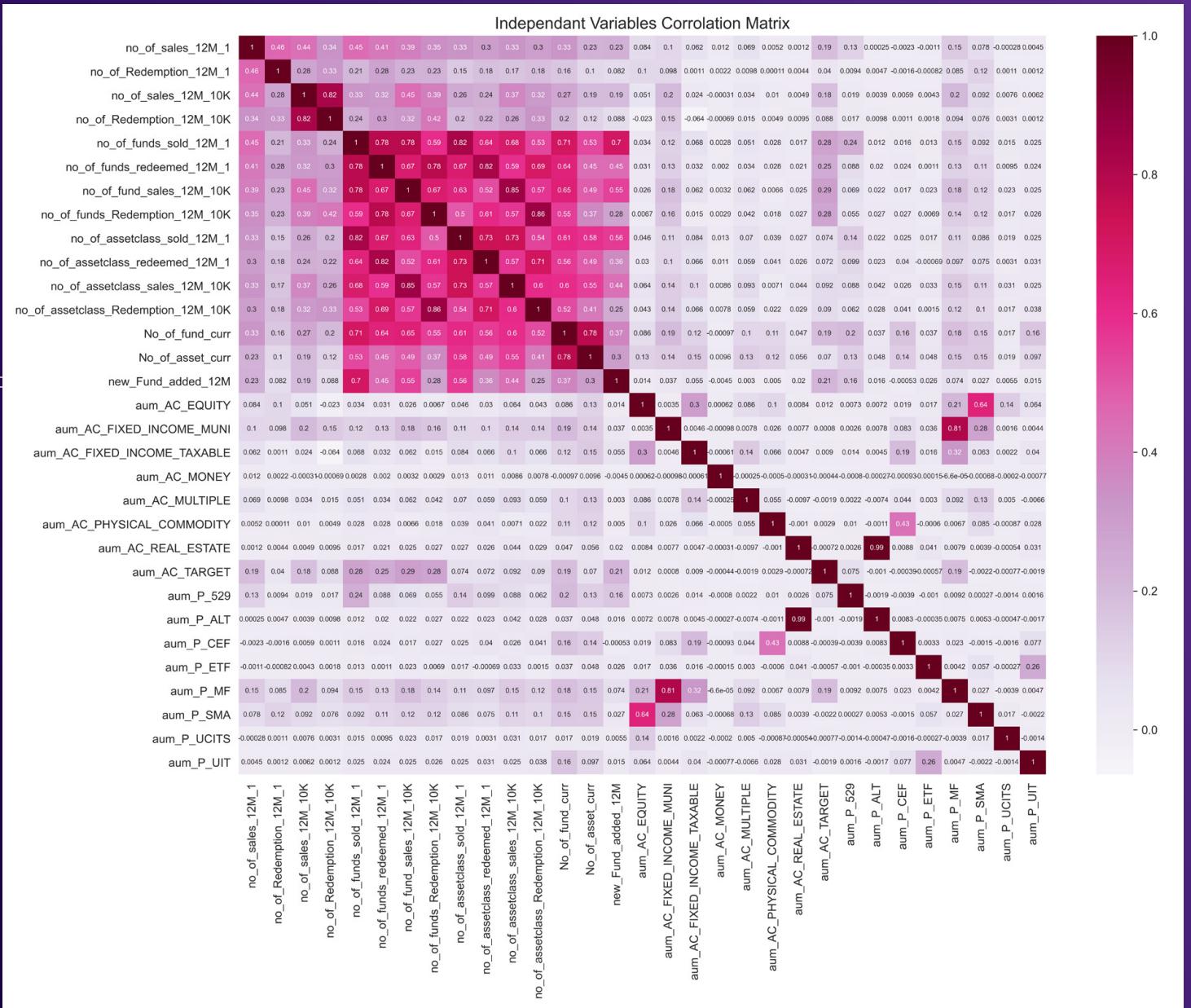


Decision Tree advisors split ==

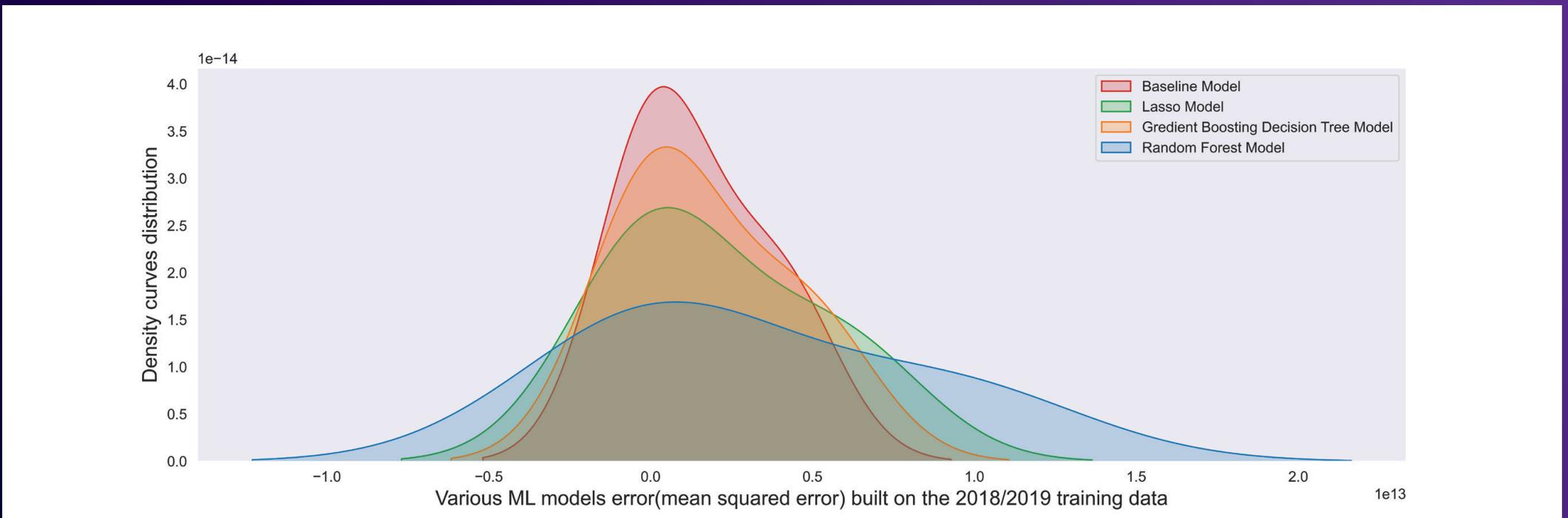


Correlation Matrix

Most of the variables are not highly correlated, except for: aum_AC_REAL_ESTATE & aum_P_ALT, so we will drop aum_P_ALT.



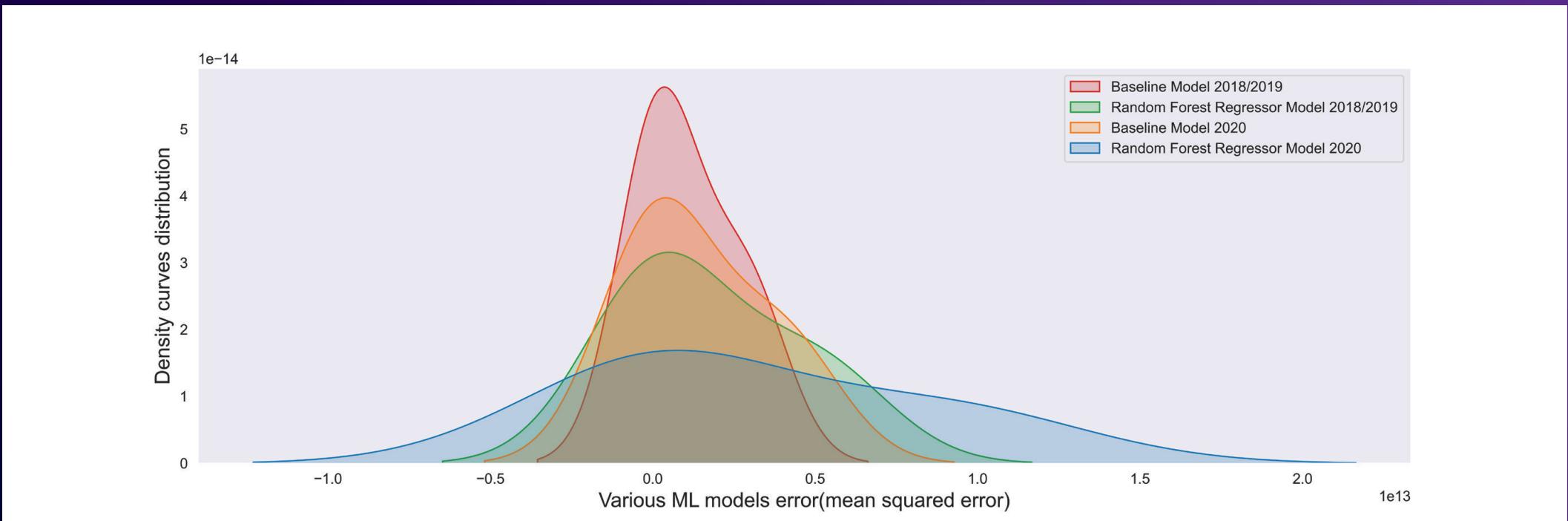
Machine Learning Models/Training Data/MSE ==



Analysis:

The Random Forest Model performs best on the training data of 2018/2019, as it has the least errors, just before the Gradient Boosting Decision Tree Model.

Machine Learning Models/Holdout data/MSE ==



Analysis:

We deduce that the results earlier built on the training data are very close to the model built on the 2020 holdout data & that the Random Forest Model has reduced the Mean Squared Error of the model.



Aerial view of a city at night, showing a dense cluster of skyscrapers with illuminated windows and streets below.

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